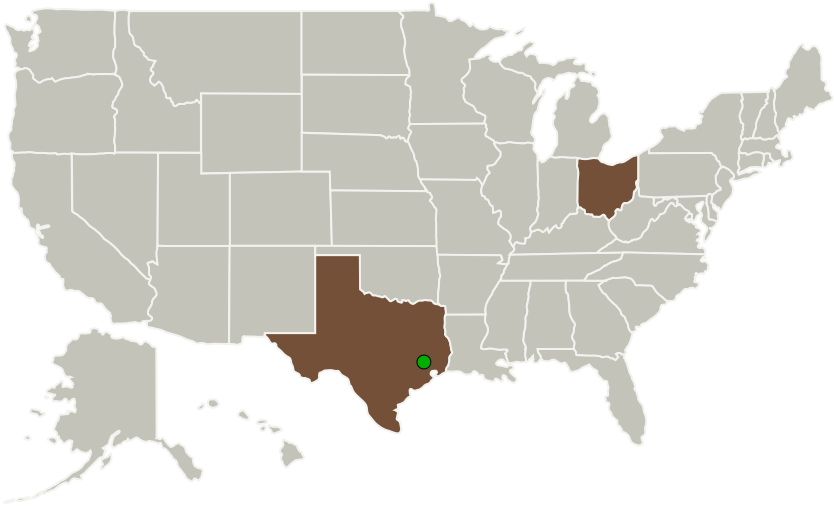
Quiet, High-Efficiency Vaneaxial Fans, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

During this Phase I effort, CRG proposes to demonstrate the ability to significantly reduce the acoustic signature of vaneaxial fans by establishing quiet aerodynamic, mechanical, and electronic design features. CRG will focus primarily on reducing tonal and broadband aerodynamic noise, using a combination of theory and experimentation to investigate the acoustic benefits of i) asymmetric blade spacing, ii) serrated trailing edge features, and iii) wearable blade tip liners on a scale representative of the NASA applications. In addition, CRG will leverage its experience in high-efficiency vaneaxial fan design, which includes the development of state-of-the-art motor and controller technology, to identify the potential noise reductions in the drive system. The Phase I results will provide a baseline for Phase II acoustic modeling, computational fluid dynamics (CFD) analysis, drive system development, and vaneaxial fan system demonstration. Finally, the transition of next generation quiet, high-efficiency vaneaxial fans into future NASA human exploration systems to increase occupant comfort, such as the predecessor to the space shuttle, commercial crew and cargo systems, lunar exploration systems, and even Mars exploration systems, defines the overall goal of the program.

Primary U.S. Work Locations and Key Partners



Quiet, High-Efficiency Vaneaxial Fans, Phase I

Table of Contents

Quiet, High-Efficiency Vaneaxial Fans, Phase I

Completed Technology Project (2011 - 2011)

Organizations Performing Work	Role	Type	Location
Cornerstone Research Group, Inc.	Lead Organization	Industry	Miamisburg, Ohio
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Ohio	Texas

Project Transitions

February 2011: Project Start

August 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138432)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Cornerstone Research Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

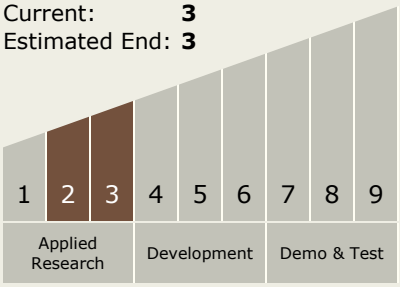
Carlos Torrez

Principal Investigator:

Chris Hemmelgarn

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Quiet, High-Efficiency Vaneaxial Fans, Phase I

Completed Technology Project (2011 - 2011)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System